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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/662,728
Filing Date: September 15, 2003
Appellant(s): GARG ET AL.

Jason Paul DeMont
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 28 April 2008 appealing from the Office action mailed 04 October 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

10662724

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6650640	Muller et al.	3-1999
6405258	Erimli et al.	5-1999
20020131365	Barker et al.	1-2001
7031341	Yu	11-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-2, 4-6, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. (US 6650640 B1) in view of Erimli et al. (US 6405258 B1) and in further view of Barker et al. (US 20020131365 A1).

Consider claims 1 and 6. Muller et al. clearly shows and discloses maintaining at a protocol-data-unit excisor a first queue of protocol data units en route to a first congestible node (("In another technique, packets received from a network are placed in a queue to await transfer to a host computer. While awaiting transfer, multiple related packets may be identified to the host computer. After being transferred, they may be processed as a group by a host processor rather than being processed serially (e.g., one at a time).") column 7 lines 51-52); and selectively dropping, at said protocol-data-unit excisor, one or more of said protocol data units based on a first metric of said first queue (("A provided method is random in that discarded packets are selected randomly from those packets that are considered discardable. Applying a random discard policy may be sufficient to avoid broken pipes by distributing the impact of dropped packets

among multiple connections or flows. In addition, if a small number of transmitting entities are responsible for a majority of the traffic received at a network interface, dropping packets randomly may ensure that the offending entities are penalized proportionately. Different embodiments of the invention that are discussed below provide various combinations of randomness and intelligence, and one of these attributes may be omitted in one or more embodiments.") column 105 lines 33-45). However, Muller et al. fails to teach of a node sending a signal that it is ready to receive a protocol data unit. Erimli et al. discloses network stations that send PAUSE frames to a flow control counter. This reads on "... receiving at said protocol-data-unit excisor a flow control signal that indicates whether said first congestible node is ready to receive one or more of said protocol data units from said first queue; ..." (("The MIB counters 48, previously described with reference to FIG. 2, include a transmit flow control counter and a receive flow control counter for counting the number of PAUSE frames transmitted or received by each of the network station. For example, each time traffic congestion at an output port for a first network station exceeds the threshold value, a PAUSE frame is transmitted to a second network station that is currently transmitting data to the first network station. The host CPU 40 will then automatically increment the value of the transmit flow control counter for the output port associated with the first network station. When the second network station receives the PAUSE frame, the host CPU 40 increments the value of the receive flow control counter for its associated output port.") column 13 lines 40-54). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate a network

station sending a PAUSE frame to adjust network flow as taught by Erimli et al. with a traffic controlling data engine as taught by Muller et al. for the purpose of efficient data flow control across a network. However, Muller et al., as modified by Erimli et al., fails to disclose a network station sending a PAUSE frame to adjust network flow and a traffic controlling data engine wherein the device could be added to legacy networks and not require replacing hardware. Barker et al. discloses Quality of Service functions implemented in input interface circuit interface devices in computer network hardware comprising congestion management wherein the device can be retrofitted into existing hardware (("Another benefit that distinguishes the present invention from prior art is the fact that the present invention could be easily retrofitted onto some existing switches just by replacing its IICs. Coupling such IICs to network management resources would be a low cost and simple way to implement QoS.") paragraph 0148).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate Quality of Service functions implemented in input interface circuit interface devices in computer network hardware comprising congestion management wherein the device can be retrofitted into existing hardware as taught by Barker et al. with a network station sending a PAUSE frame to adjust network flow and a traffic controlling data engine as taught by Muller et al., as modified by Erimli et al., for the purpose of cost effective congestion management.

Consider claims 2 and 9, and as applied to claims 1 and 6, respectively. Muller et al., as modified by Erimli et al. and Barker et al., discloses a protocol-data-unit excisor deciding whether to drop a protocol data unit based on Random Early Detection (("...

discarding packets on the basis of a probability indicator injects randomness into the discard process. A random early discard policy may be sufficient to avoid the problem of broken pipes discussed above. In particular, in one embodiment of the invention, all packets are considered discardable, such that all packets are counted by counter 2410 and all are candidates for being dropped. As already discussed, however, in another embodiment of the invention intelligence is added in the process of excluding certain types of packets from being discarded.") Muller et al., column 107 lines 60-67 and column 108 lines 1-3).

Regarding claims 4 and 8, and as applied to claims 1 and 6, respectively. Muller et al., as modified by Barker et al., discloses a system for managing network flow. However, Muller et al., as modified by Barker et al., fails to teach of a system comprising Pause frame procedure of IEEE 802.3. Erimli et al. discloses a method and apparatus for controlling the flow of data frames comprising PAUSE frame. This reads on "... indication is conveyed using the Pause frame procedure of IEEE 802.3." (("A proposed flow control arrangement for a duplex environment, referred to as IEEE 802.3x[2], specifies generation of a flow control message, for example a PAUSE frame, to regulate the transfer of data and reduce congestion.") column 2 lines 24-31).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate PAUSE frame as taught by Erimli et al. with a system for managing network flow as taught by Muller et al., as modified by Barker et al., for the purpose of using the well known method of PAUSE frame to configure flow control.

Regarding claims 5 and 10, and as applied to claims 1 and 6, respectively. Muller et al., as modified by Barker et al., discloses lookahead pointers. This reads on "...a second ... or more protocol data units en route ...; and a second ... flow control signal ..." (("In this alternative embodiment a second read pointer may be used to index control queue 118 to assist in the population of memory 2102. In particular, the second read pointer may be used by packet batching module 122 to find and fetch entries for memory 2102. Illustratively, if the second, or "lookahead" read pointer references the same entry as the control queue's write pointer, then it could be determined that no new entries were added to control queue 118 since the last check by controller 2104. Otherwise, as long as there is an empty (e.g., invalid) entry in memory 2102, the necessary information (e.g., flow number) may be copied into memory 2102 for the packet corresponding to the entry referenced by the lookahead read pointer. The lookahead read pointer would then be incremented.") Muller et al., column 100 lines 43-56). However, Muller et al., as modified by Barker et al., fails to teach of two or more queues and a target node. Erimli et al. discloses multiple read and write queues attached to an overflow engine and network stations. This reads on "...a second queue for storing one or more protocol data units en route to a second congestible node; and a second receiver for receiving a flow control signal that indicates whether said second congestible node is ready to receive one or more of said protocol data units from said second queue; wherein said processor is also for selectively dropping one or more of said protocol data units based on a metric of said second queue." (("According to the exemplary embodiment illustrated in FIG. 4, the queue write side 410 may include a low

priority portion 410a and a high priority portion 410b. A switching circuit, such as a multiplexer 418, may be provided to forward entries to either the low priority portion 410a or the high priority portion 410b of the queue write side 410. In such a case, the multiplexer 418 may direct the data to the appropriate portion of the queue write side 410 under the control of a queue state machine 420, which examines certain fields in the entry to determine its priority. Alternative logic circuitry may also be provided to receive the entries and determine to which portion of the queue write side 410 the entries should be forwarded.") column 10 lines 32-44 ("The MIB counters 48, previously described with reference to FIG. 2, include a transmit flow control counter and a receive flow control counter for counting the number of PAUSE frames transmitted or received by each of the network station. For example, each time traffic congestion at an output port for a first network station exceeds the threshold value, a PAUSE frame is transmitted to a second network station that is currently transmitting data to the first network station. The host CPU 40 will then automatically increment the value of the transmit flow control counter for the output port associated with the first network station. When the second network station receives the PAUSE frame, the host CPU 40 increments the value of the receive flow control counter for its associated output port.") column 13 lines 40-54).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate multiple holding queues as taught by Erimli et al. with network flow control management with lookahead capabilities as taught

by Muller et al., as modified by Barker et al., for the purpose of buffering or caching input / output data.

Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. (US 6650640 B1) as modified by Erimli et al. (US 6405258 B1) in further view of Yu (US 7031341 B2) and in further view of Barker et al. (US 20020131365 A1).

Regarding claims 3 and 7, and as applied to claims 1 and 6, respectively. Muller et al., as modified by Erimli et al. and Barker et al., discloses a system for managing network flow. However, Muller et al, as modified by Erimli et al. and Barker et al., fails to teach of a system comprising backpressure flow control. Yu discloses an interface apparatus comprising a frame buffer memory interface using high speed external ports and back pressure flow control (IEEE802.3x). This reads on "... said indication is conveyed using back-pressure flow control." (("In half-duplex mode, all ports support back pressure flow control, to minimize the risk of losing data for long activity bursts.") column 42 lines 26-28).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate back-pressure flow control as taught by Yu with a system for managing network flow as taught by Muller et al., as modified by Erimli et al. and Barker et al., for the purpose of minimal network delay.

(10) Response to Argument

Appellant's arguments: pages 15-17 of the Appeal Brief

Claim 1. Nowhere Miller nor Erimli, alone or in combination, teach or suggest, what claim 1 recites -- namely, receiving a first plurality of protocol data units at a first input, wherein all of the protocol data units are en route to a first congestible node. In other words, all of the protocol data units that arrive at one input are destined for one congestible node -- not one of two or three nodes -- but exactly one node.

Examiner's response:

Examiner interprets a congestible node to be any device on a network that receives packets and that has the potential to become burdened by said packets. Some examples of congestible nodes could be a network interface circuit (NIC), a modem, switch, router or other communication port or device (("In one embodiment of the present invention, a network interface circuit (NIC) is configured to receive and process communication packets exchanged between a host computer system and a network such as the Internet. In particular, the NIC is configured to receive and manipulate packets formatted in accordance with a protocol stack (e.g., a combination of communication protocols) supported by a network coupled to the NIC.") Muller et al., column 6 lines 54-61 ("In addition, the processing of packets described below may be performed on communication devices other than a NIC. For example, a modem, switch, router or other communication port or device (e.g., serial, parallel, USB, SCSI) may be

similarly configured and operated.") Muller et al., column 7 lines 15-19). Examiner interprets a first congestible congestible node to be a network interface circuit (NIC) comprising various modules (("FIG. 1A depicts NIC 100 configured in accordance with an illustrative embodiment of the invention. A brief description of the operation and interaction of the various modules of NIC 100 in this embodiment follows. Descriptions incorporating much greater detail are provided in subsequent sections. A communication packet may be received at NIC 100 from network 102 by a medium access control (MAC) module (not shown in FIG. 1A). The MAC module performs low-level processing of the packet such as reading the packet from the network, performing some error checking, detecting packet fragments, detecting over-sized packets, removing the layer one preamble, etc.") Muller et al., column 8 lines 27-39). Examiner interprets all protocol data units to be en route to said first congestible node wherein all packets that are destined to a host computer system or other communication device must pass through said first congestible node (("In embodiments of the invention described below, a NIC receives a packet from a network on behalf of a host computer system or other communication device. The NIC analyzes the packet (e.g., by retrieving certain fields from one or more of its protocol headers) and takes action to increase the efficiency with which the packet is transferred or provided to its destination entity.") Muller et al., column 7 lines 20-26).

Claim 6. For essentially the same reasons as those given with respect to claim 1, the applicants respectfully submit that the rejection of it is traversed. Because

claims 8-10 depend on claim 6, the applicants respectfully submit that the rejection of them is also traversed.

Examiner's response:

Examiner points to the same arguments given with respect to claim 1.

Claims 3 and 7. Claims 3 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over S. Miller et al., U.S. Patent 6,650,640 B1 (hereinafter "Miller") in view of B. Erimli et al., U.S. Patent 6,405,258 B1 (hereinafter "Erimli") and further in view of S. Yu, U.S. Patent 7,031,341 (hereinafter "Yu"). Because claim 3 depends on Yu fails to cure the deficiency of Miller and Erimli with respect to claim 1, the applicants respectfully submit that the rejection of claim 3 is traversed. Because claim 7 depends on Yu fails to cure the deficiency of Miller and Erimli with respect to claim 6, the applicants respectfully submit that the rejection of claim 7 is traversed.

Examiner's response:

Examiner does not understand this argument for claims 3 and 7 as they are not presented with the facts from any of the references. However, Examiner would like to point out that Yu discloses an interface apparatus comprising a frame buffer memory interface using high speed external ports and back pressure flow control (IEEE802.3x). This reads on "... said indication is conveyed using back-pressure flow control." (("In half-duplex mode, all ports support back pressure flow control, to minimize the risk of

losing data for long activity bursts.") column 42 lines 26-28). The back-pressure flow control as taught by Yu teaches the back-pressure flow control of claims 3 and 7.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Mark D Fearer/

Examiner, Art Unit 2143

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